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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/909,530	07/20/2001	Kevin W. Humphreys	M61.12-0347	6267

7590 01/12/2005

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EXAMINER	
SHORTLEDGE, THOMAS E	

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/909,530	HUMPHREYS ET AL.	
	Examiner	Art Unit	
	Thomas E Shortledge	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,12-20 and 23-30* is/are rejected.

7)☒ Claim(s) *10,11,21,22,31,32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/14/2002*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. Claims 10,11,21,22,31, and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

2. The following is a statement of reasons for the indication of allowable subject matter: Claims 10, 21, and 31 describe that within the act of selecting the substructure with the highest statistical goodness measure value to expand the tree, a copy of the current tree is created for each of the generated substructures at the current phrase level. Each of the substructures are then added to the copied tree, and then the statistical goodness measure of each substructure is combined with the overall score of the tree to which it is added.

Su et al. (5,418,717) teach combining the score of each of the lower node within a created syntax tree to find the overall score of the tree.

Su et al. do not nor fairly suggest teach creating a copy of the current tree for each of the generated substructure at the current phrase level, nor adding each generated substructure to the created tree.

Dependent claims 11, 22, and 32 are allowed since they further limit each of the respective independent claim or their own parent claims.

3. Claims 6,17, and 27 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

4. The following is a statement of reasons for the indication of allowable subject matter: Claims 6, 17, and 27 describe identifying generation rules that apply to the non-terminal leaf node at the current phrase level, and the non-terminal leaf node at a lower phrase level which express the same semantic attributes as a rule a the current phrase level.

Su et al. teach applying generation rules for a current word obtained from a syntax tree to complete a word-for-word substitution for the word.

Su et al. do not teach nor fairly suggest applying rules to a non-terminal leaf node at a lower phrase level, which express the same semantic attributes as a rule at the current phrase level.

Claim Rejections - 35 USC § 112

5. Claims 6, 17, and 27 recite the limitation "the non-terminal leaf node" in line 7 of claim 6 and 17, and line 8 of claim 27. There is insufficient antecedent basis for this limitation in the claim. The examiner has interpreted this to read "a non-terminal leaf node."

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 5, 9, 12,16, and 20, are rejected under 35 U.S.C. 102(b) as being anticipated by Su et al. (5,418,717).

As to claims 1, and 12, Su et al. teach:

a computer-readable medium having computer executable instructions for performing the sentence generating steps (a processor that is able to execute a sequence of instructions in the form of applications or programs, which are typically loaded into the main memory, col. 6, lines 56-69);

mapping a semantic representation to an unordered set of syntactic nodes, (a sentence is divided down into simpler, meaningful linguistic tokens or units which are then mapped to a tree, col. 5, lines 58-61);

using grammar rules from a generation grammar and statistical goodness measure values ("score-function") from corresponding analysis to create a tree (rule-based parsing which includes grammar rules, and a "score-function" is used to create syntax trees, col. 6, lines 14-17);

generating a sentence from the tree structure (a translated output is created from the tree structures, col. 6, lines 24-29).

As to claims 5, and 16 Su et al. teach:

(B)(1) selecting a syntactic node to be the root node of a new syntactic tree (a tree is created by performing syntactic and semantic analysis on the subjects and objects of the sentence, col. 6, lines 1-9);

(B)(2) identifying generation grammar rules that apply to each leaf node in the tree, by testing rule conditions on semantically derived attributes of the nodes (the tree has branches representing the attributes and actions of the subjects and objects found through semantic and syntactic analysis, col. 6, lines 1-9);

(B)(3) generating syntactic substructures described by each applicable rule and determining a statistical goodness measure value for each substructure (the rule-based parsing employs a "score function" for measuring the quality of candidate syntax trees, col. 6, lines 14-17); and

(B)(4) selecting the substructure with the highest statistical goodness measure value to use to expand the tree, (the syntactic score is based on the probability of a phrase level, and the immediately preceding phrase level, col. 13, lines 35-40).

As to claims 9, and 20 Su et al. teach:

(B)(2)(i) identifying generation grammar rules that apply to the non-terminal leaf node at the current phrase level, (the non-terminals may be divided into additional levels, where the words are examined for some words or syntactical categories to the left or right of the word to find the probability scores, (col. 9, lines 40-49). It would be inherent that since the word is examined based on whether it belonged to a verb or noun phrase, grammar rules applying the word would be identified first).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 2-4, 7-8, 13-15, and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Su et al. as applied to claims 1, 5, 12 and 16 above.

As to claims 2, and 13, Su et al. teach using grammar rules from the generation grammar further includes using a simplified form of the analysis grammar as the generation grammar, (during the generation of the sentence, a word-for-word substitution is made, (col. 6, lines 26-29). It would have been obvious to one of ordinary skill in the art at the time of the invention that the word-for-word substitution would be done by using grammar that is a simplified version of the grammar used during analysis, since during generation only the grammar applying to each word is needed to increase the speed of processing and to produce a high quality output as taught by Su et al. (col. 4, lines 55-58)).

As to claims 3, and 14, Su et al. teach the analysis grammar includes lists of conditions for each grammar rule, and wherein using the simplified form of the analysis grammar as the generation grammar further comprises ignoring all conditions from the analysis grammar except those directly related to semantic representation, (during the generation of the sentence, a word-for-word substitution is made, (col. 6, lines 26-29). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a grammar that only includes the rules relevant to the direct word-for-word substitution between the source and the target language to increase the speed of processing and to produce a high quality output as taught by Su et al. (col. 4, lines 55-58)).

As to claims 4, and 15, Su et al. teach using the simplified form of the analysis grammar as the generation grammar further comprises using a context free form of a context sensitive analysis grammar as the generation grammar, (during the generation of the sentence a word-for-word substitution is made, (col. 6, lines 26-29). It would have been obvious to one of ordinary skill in the art at the time of the invention that the grammar be context free since it is only a word-for-word substitution, and at this point the translation is not based on the surrounding words to increase the speed of processing and to produce a high quality output as taught by Su et al. (col. 4, lines 55-58)).

As to claims 7, and 18, Su et al. teach:

B(4)(i) discarding generated substructures that have lower statistical goodness measure values than substructures generated by alternative equivalent generation grammar rules at other phrase levels (a threshold is set based on the semantic and syntactic scores, and those phrases that fall below the threshold are not selected, and those phrases that have been generated fall above the threshold are selected, col. 10, lines 19-25);

(B)(4)(ii) adding the remaining substructure at the current phrase level with the highest statistical goodness measure value to the current syntactic tree, (the score is expressed as the probability of an input having a particular semantic annotation, a particular syntactic structure, and a particular lexical category sequence, (col. 10, lines 44-47). It would have been obvious to one of ordinary skill in the art at the time of the

invention that the phrase meeting the threshold of the semantic annotation tree would then be applied to the syntactic structure tree to create an output with the highest probability to increase the speed of processing and to produce a high quality output as taught by Su et al. (col. 4, lines 55-58));

(B)(4)(iii) if no substructures exist at the current phrase level, step down one phrase level, and repeat method steps (B)(4)(i) and (B)(4)(ii), (the threshold may be dynamic, were the value is always changing, (col. 10, lines 30-34). It would have been obvious to one of ordinary skill in the art at the time of the invention that since the threshold is dynamic, if at a certain value no phrases are available, the threshold would drop in value to allow a phrase to be selected to increase the speed of processing and to produce a high quality output as taught by Su et al. (col. 4, lines 55-58)).

As to claims 8, and 19, Su et al. teach repeating steps (B)(2), B(3), and B(4), (trees are created for the attributes of the subject and object of the sentence, (col. 6, lines 6-10). It would have been obvious to one of ordinary skill in the art at the time of the invention that once the highest score is found for the subject, the steps would be repeated to find the highest score for the object to increase the speed of processing and to produce a high quality output as taught by Su et al. (col. 4, lines 55-58)).

10. Claims 23-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Su et al. in view of Kuno et al. (5,528;491).

As to claim 23, Su et al. teach:

a sentence generating system for generating a natural language sentence from an input semantic representation, (creating a sentence from a semantically analyzed input, col. 6 lines 3, and 30-33);

a node mapper which maps the semantic representation to an unordered set of syntactic nodes (a sentence is divided down into simpler, meaningful linguistic tokens or units which are then mapped to a tree, col. 5, lines 58-61);

a syntactic node orderer which uses grammar rules from a generation grammar and statistical goodness measure ("score-function") values from a corresponding analysis grammar to create a tree (syntax tree) structure to order the syntactic nodes (syntax tree), (rule-based parsing which includes grammar rules, and a "score-function" is used to create syntax trees, col. 6, lines 14-17); wherein the generation grammar is a simplified form of the analysis grammar (during the generation of the sentence, a word-for-word substitution is made, (col. 6, lines 26-29). It would have been obvious to one of ordinary skill in the art at the time of the invention the word-for-word substitution would be done by using grammar that is a simplified version of the grammar used during analysis, since during generation only the grammar applying to each word is needed to increase the speed of processing and to produce a high quality output as taught by Su et al. (col. 4, lines 55-58));

Su et al do not teach an inflection generator which produces an inflected form of leaf nodes in the tree structure and generates the sentence from the tree structure with the inflected form of the leaf nodes.

However, Kuno et al. teach generating an output sentence from a tree structure by applying synthesis rules, (col. 9, lines 53-65), where the output conversation sentence maybe in the form of voice, (col. 3, lines 27-30). It would have been obvious to one of ordinary skill in the art at the time of the invention that because inflection placed on words can change the meaning of a sentence, during the analysis of the tree structure with the synthesis rules, these rules would include rules for providing the inflected form of the node to provide the correct understanding of the voice output.

Therefore It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the input analysis and score creation methods of Su et al. with the voice output of Kuno et al. to increase the speed of conversation as taught by Kuno et al. (col. 1, lines 61-63).

As to claim 24, Su et al. teach the analysis grammar includes list of conditions for each grammar rule, and wherein he simplified form of the analysis grammar used by the syntactic node orderer as the generation grammar ignores all conditions from the analysis grammar except those directly related to semantic representation (during the generation of the sentence, a word-for-word substitution is made, (col. 6, lines 26-29). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a grammar that only includes the rules relevant to the direct word-for-word substitution between the source and the target language to increase the speed of processing and to produce a high quality output as taught by Su et al. (col. 4, lines 55-58)).

As to claim 25, Su et al. teach using the simplified form of the analysis grammar as the generation grammar further comprises using a context free form of a context sensitive analysis grammar as the generation grammar, (during the generation of the sentence a word-for-word substitution is made, (col. 6, lines 26-29). It would have been obvious to one of ordinary skill in the art at the time of the invention that the grammar be context free since it is only a word-for-word substitution, and at this point the translation is not based on the surrounding words to increase the speed of processing and to produce a high quality output as taught by Su et al. (col. 4, lines 55-58)).

As to claim 26, Su et al. teach:

(B)(1) selecting a syntactic node to be the root node of a new syntactic tree (a tree is created by performing syntactic and semantic analysis on the subjects and objects of the sentence, col. 6, lines 1-9);

(B)(2) identifying generation grammar rules that apply to each leaf node in the tree, by testing rule conditions on semantically derived attributes of the nodes (the tree has branches representing the attributes and actions of the subjects and objects found through semantic and syntactic analysis, col. 6, lines 1-9);

(B)(3) generating syntactic substructures described by each applicable rule and determining a statistical goodness measure value for each substructure (the rule-based parsing employs a "score function" for measuring the quality of candidate syntax trees, col. 6, lines 14-17); and

(B)(4) selecting the substructure with the highest statistical goodness measure value to use to expand the tree, (the syntactic score is based on the probability of a phrase level, and the immediately preceding phrase level, col. 13, lines 35-40).

As to claim 28, Su et al. teach:

B(4)(i) discarding generated substructures that have lower statistical goodness measure values than substructures generated by alternative equivalent generation grammar rules at other phrase levels (a threshold is set based on the semantic and syntactic scores, and those phrases that fall below the threshold are not selected, and those phrases that have been generated fall above the threshold are selected, col. 10, lines 19-25);

(B)(4)(ii) adding the remaining substructure at the current phrase level with the highest statistical goodness measure value to the current syntactic tree, (the score is expressed as the probability of an input having a particular semantic annotation, a particular syntactic structure, and a particular lexical category sequence, (col. 10, lines 44-47). It would have been obvious to one of ordinary skill in the art at the time of the invention that the phrase meeting the threshold of the semantic annotation tree would then be applied to the syntactic structure tree to create an output with the highest probability to increase the speed of processing and to produce a high quality output as taught by Su et al. (col. 4, lines 55-58));

(B)(4)(iii) if no substructures exist at the current phrase level, step down one phrase level, and repeat method steps (B)(4)(i) and (B)(4)(ii), (the threshold may be

dynamic, were the value is always changing, (col. 10, lines 30-34). It would have been obvious to one of ordinary skill in the art at the time of the invention that since the threshold is dynamic, if at a certain value no phrases are available, the threshold would drop in value to allow a phrase to be selected to increase the speed of processing and to produce a high quality output as taught by Su et al. (col. 4, lines 55-58)).

As to claim 29, Su et al. teach repeating steps (B)(2), B(3), and B(4), (trees are created for the attributes of the subject and object of the sentence, (col. 6, lines 6-10). It would have been obvious to one of ordinary skill in the art at the time of the invention that once the highest score is found for the subject, the steps would be repeated to find the highest score for the object to increase the speed of processing and to produce a high quality output as taught by Su et al. (col. 4, lines 55-58)).

As to claim 30, Su et al. teach:

(B)(2)(i) identifying generation grammar rules that apply to the non-terminal leaf node at the current phrase level, (the non-terminals may be divided into additional levels, where the words are examined for some words or syntactical categories to the left or right of the word to find the probability scores, (col. 9, lines 40-49). It would be inherent that since the word is examined based on whether it belonged to a verb or noun phrase, grammar rules applying the word would be identified first).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kutsumi et al. (5,495,413), Carter et al. (6,108,619), Schabes et al. (5,799,269), Weise (6,275,791), Okajima et al. (4,942,526), Segond et al. (6,405,162), and Kuno et al. (5,528,491).

Kutsumi et al. teach using priority scoring to create a translation of an input based on the syntax of the input.

Carter et al. teach parsing the content of the input into phrases and tokens and then finding the matching semantic records.

Schabes et al. teach using the part of speech of the input to determine if the grammar is correct or not.

Weise teaches using templates during parsing to decrease the amount of errors during parsing.

Okajima et al. teach determining whether or not a sequence of words in a given sentence described in a natural language is semantically correct.

Segond et al. teach selecting and applying a rule to an input based on the information of the input.

Kuno et al. teach automated natural language translation, where the translation operations include semantic propagation based on stored grammar rules.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas E Shortledge whose telephone number is (703)605-1199. The examiner can normally be reached on M-F 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Talivaldis Smits can be reached on (703)306-3011. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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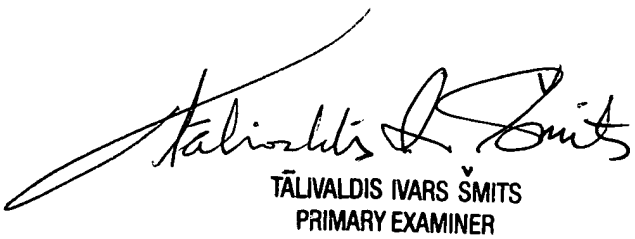

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